Click Here to Return to Main Document

APPENDIX B

ANALYTICAL DATA - 1 DISKETTE

TARGET SHEET

THE MATERIAL DESCRIBED BELOW
WAS NOT SCANNED BECAUSE:

() OVERSIZED

(X) NON-PAPER MEDIA

() OTHER:

DESCRIPTION: DOC# 11549
APPENDIX B ANALYTICAL DATA -
1 DISKETTE.

THE OMITTED MATERIAL IS AVAILABLE FOR REVIEW
BY APPOINTMENT
AT THE EPA NEW ENGLAND SUPERFUND RECORDS CENTER,
BOSTON, MA

APPENDIX C
HYDROLOGIC AND HYDRAULIC ANALYSIS

Raymark - Ferry Creek
Operable Unit No. 3
Stratford, Connecticut

Hydrologic and Hydraulic Analysis
Remedial Investigation and Feasibility Study

March 1998

US Army Corps
of Engineers

New England District

STRATFORD SUPERFUND SITES
HYDROLOGIC EVALUATION OF AREAS OF CONCERN
STRATFORD, CONNECTICUT

1. DRAINAGE AREAS

1.1 General. Due to the widespread nature of the study area, drainage areas were delineated for each Area of Concern (AOC) identified during this investigation. These AOCs are depicted on figure 1, and the drainage areas are shown on figure 2.

1.2 Drainage Area A. Area A is the 1,330 acre watershed of Ferry Creek. It is a long narrow area extending from the tide gates and pump station at Broad Street in the south to Huntington Road and Connors Lane in the north, a distance of about 3 miles. The elevations in the watershed vary from 0 feet NGVD in the lower watershed near Broad Street to 150 feet NGVD in the northern upstream area. Elevations of potential fill areas within the Ferry Creek wetlands are generally below 10 feet NGVD.

The headwaters of Ferry Creek drain into Brewsters Pond via some intermittent streams and an extensive storm drain system. Brewsters Pond empties into Long Brook which flows southerly into Ferry Creek in the vicinity of Interstate 95 through a 6 by 10-foot box culvert. Ferry Creek flows into the Housatonic River at Broad Street. Three 72-inch diameter culverts with flap gates carry flow from upper Ferry Creek into the lower reaches of the waterway.

In the 1960s, the Corps completed feasibility level design of a hurricane barrier to protect this portion of Stratford against severe coastal storms. This barrier consisted of several dikes and pumping stations, one of which was proposed at Broad Street. During these past studies, a design flow of 800 cfs was adopted for Ferry Creek at Broad Street. This project was never constructed due to environmental concerns.

In the early 1980s, the Town of Stratford constructed a pump station at Broad Street very similar to earlier facility proposed by the Corps. The facility was designed to pump excess stormwater from Ferry Creek and downtown Stratford resulting from the town's adopted 100-year storm (design flow of 800 cfs) to the Housatonic side of Broad Street against a 25-year tide elevation (9.2 feet NGVD). Equipped with three 60-inch vertical axial flow pumps, the station is capable of pumping 360,000 gpm at a 13.7 foot head. The station is also equipped with three 168 by 84-inch hydraulic sluice gates, remote water level monitoring equipment, and an emergency generator. During tidal events above 9.2 feet NGVD, the Housatonic River overtops low areas surrounding the pump station and the pumps are incapable of pumping against the high head, making the station ineffective.

1.3 Drainage Area B. Area B consists of the extreme lower end of Ferry Creek, which is subject to tidal inflow and outflow, and Brown's Boat Yard. Of this 70 acre drainage area, about half flows into Selby Pond via overland flow, which drains to the Housatonic River through an open drainage ditch. The remainder flows in a storm drain system which drains into Ferry Creek.

The drainage area is primarily flat, residential land. Most of the flow from this area is carried to Selby Pond and Ferry Creek via the town storm drain system. Although tidally influenced, the average pond elevation of Selby Pond is about 3.6 feet NGVD. Wetlands in lower Ferry Creek and the boat yard are generally below about 5 feet NGVD.

1.4 Drainage Area C. Area C is a 45 acre watershed draining towards the Housatonic Boat Club. The area is mostly residential and drains through a stormdrain network to the wetlands and tidal inlet near the end of South Street. Fill areas within the boat club are generally above elevation 9 feet NGVD, however, wetland areas average between 2.5 and 3 feet NGVD.

1.5 Drainage Area D. This 75 acre watershed drains Area D, also referred to as Beacon Point and Birdseye Boat Launch, to the Housatonic River. Runoff from the mostly residential area drains through a storm drain system to the tidal inlet near the end of South Street. Runoff from the boat launch drains directly into the Housatonic River as overland flow. The fill and wetland areas within this AOC are generally below elevation 5 feet NGVD.

1.6 Drainage Area E. Area E is a 30 acre watershed located between Elm Street and the wastewater treatment plant. This area is flat and consists primarily of some limited residential development and wetlands. There are few drainage structures in this area and most of the overland flow collects in the wetland and infiltrates into the groundwater. The wetlands within area E are below elevation 5 feet NGVD.

2. TIDAL HYDRAULICS

2.1 General. In the study area, tides are semi-diurnal, with two high and low waters occurring during a lunar day (approximately 24 hours and 50 minutes). The resulting tide range is constantly varying in response to relative positions of the earth, moon, and sun, with the moon having the primary tide-producing effect. Maximum tide ranges occur when orbital cycles of these bodies are in phase. A complete sequence of astronomic tide ranges, approximately repeated over an interval of 19 years, is known as a tidal epoch. The total effect of astronomic tides (described above), combined with storm surge produced by wind, wave, and atmospheric pressure distributions, is reflected in actual tidal water surface elevations. Since the astronomical tide is so variable at the study area, time of occurrence of the storm surge greatly affects the magnitude of the resulting tide level.

Water levels within all of the AOCs can be impacted by stages on the tidally affected Housatonic River. Although detailed tidal information is not available at each of the sites, tidal profiles and frequency information have been developed at Stratford Point, Long Island Sound, at the mouth of the Housatonic. This information is presented in tidal profiles as developed by the Corps of Engineers in September 1988 and shown in figures 3 and 4. Table 1 lists pertinent tide frequencies and elevations from the profiles.

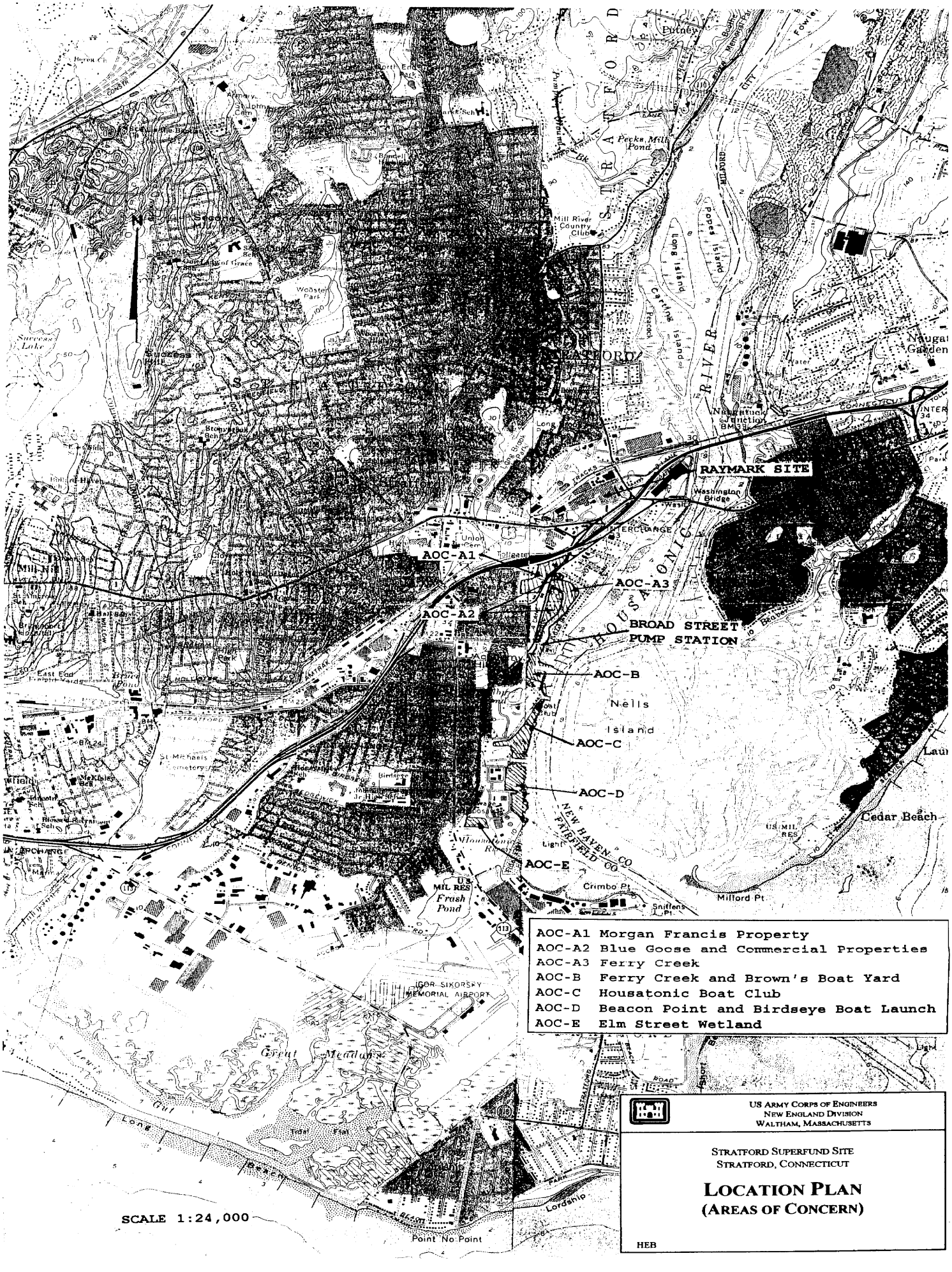
Table 1

Estimated
Tidal Datum Planes
Stratford, Connecticut

(Estimated from correlation with the Bridgeport, CT, National Ocean Service tide gage data and the Corps of Engineers Tidal Flood Profiles, New England Coastline, dated September 1988)

Tide Event	Tide Level (feet NGVD)
100-Year Frequency Flood Event	10.1
50-Year Frequency Flood Event	9.6
September 1938 Hurricane	9.3
Hurricane Carol, 1954	9.3
11 December 1992 Storm	9.3
31 October 1991 Storm	8.6
10-Year Frequency Flood Event	8.5
Maximum Astronomic High Water	6.3
1-Year Frequency Flood Event	5.7
Mean Spring High Water	4.5
Mean High Water	4.1
Mean Tide Level	0.7
National Geodetic Vertical Datum	0
Mean Low Water	-2.7
Mean Lower Low Water	-2.9
Mean Spring Low Water	-3.2

In addition to the detailed tide information presented in table 1, tidal datum information published by the National Ocean Survey for the Housatonic River at the I-95 bridge are presented in table 2.



AOC-A1	Morgan Francis Property
AOC-A2	Blue Goose and Commercial Properties
AOC-A3	Ferry Creek
AOC-B	Ferry Creek and Brown's Boat Yard
AOC-C	Housatonic Boat Club
AOC-D	Beacon Point and Birdseye Boat Launch
AOC-E	Elm Street Wetland

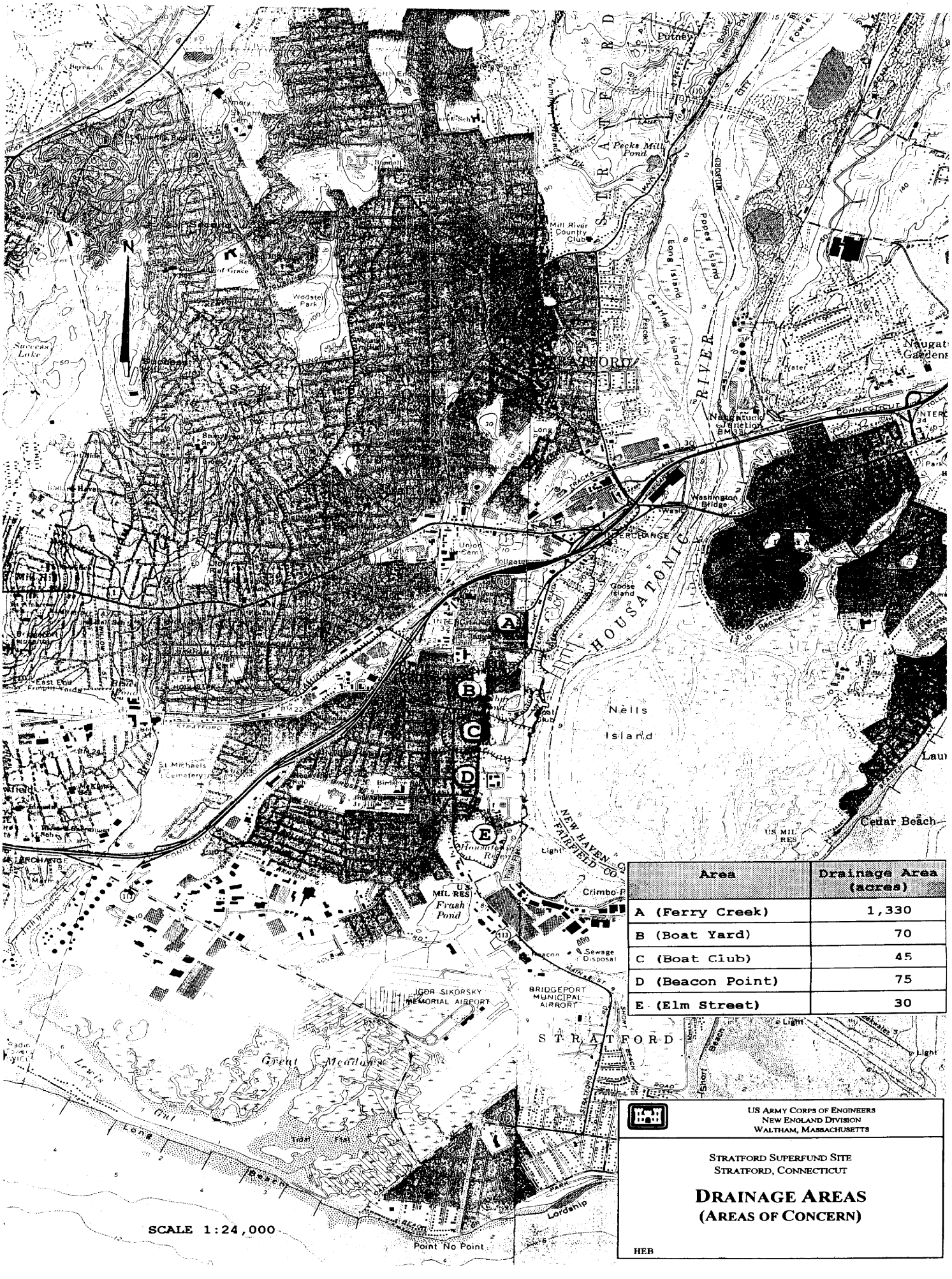
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS

STRATFORD SUPERFUND SITE
STRATFORD, CONNECTICUT

LOCATION PLAN
(AREAS OF CONCERN)

HEB

FIGURE 1



Area	Drainage Area (acres)
A (Ferry Creek)	1,330
B (Boat Yard)	70
C (Boat Club)	45
D (Beacon Point)	75
E (Elm Street)	30

US ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS

STRATFORD SUPERFUND SITE
STRATFORD, CONNECTICUT

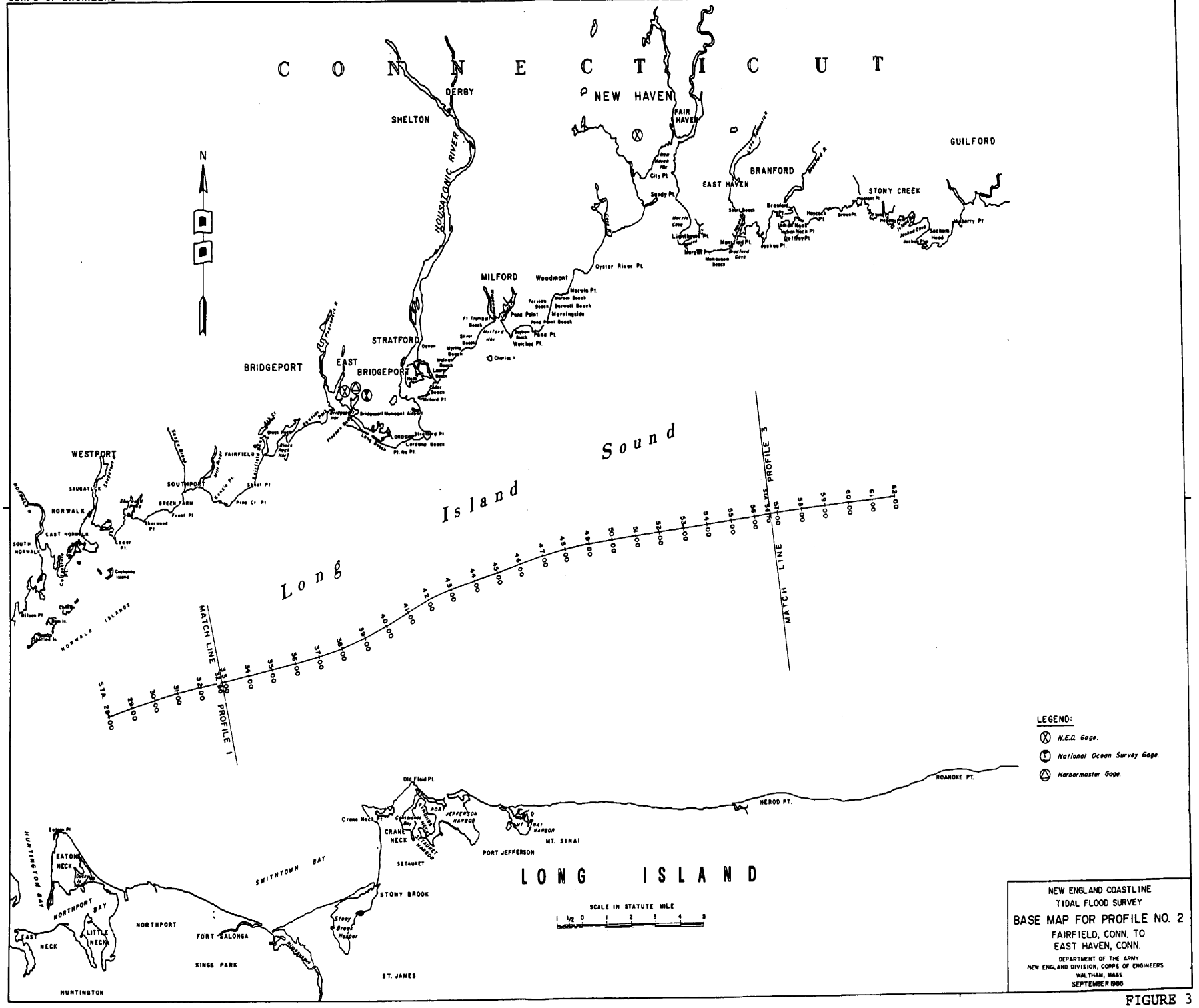
DRAINAGE AREAS
(AREAS OF CONCERN)

HEB

FIGURE 2

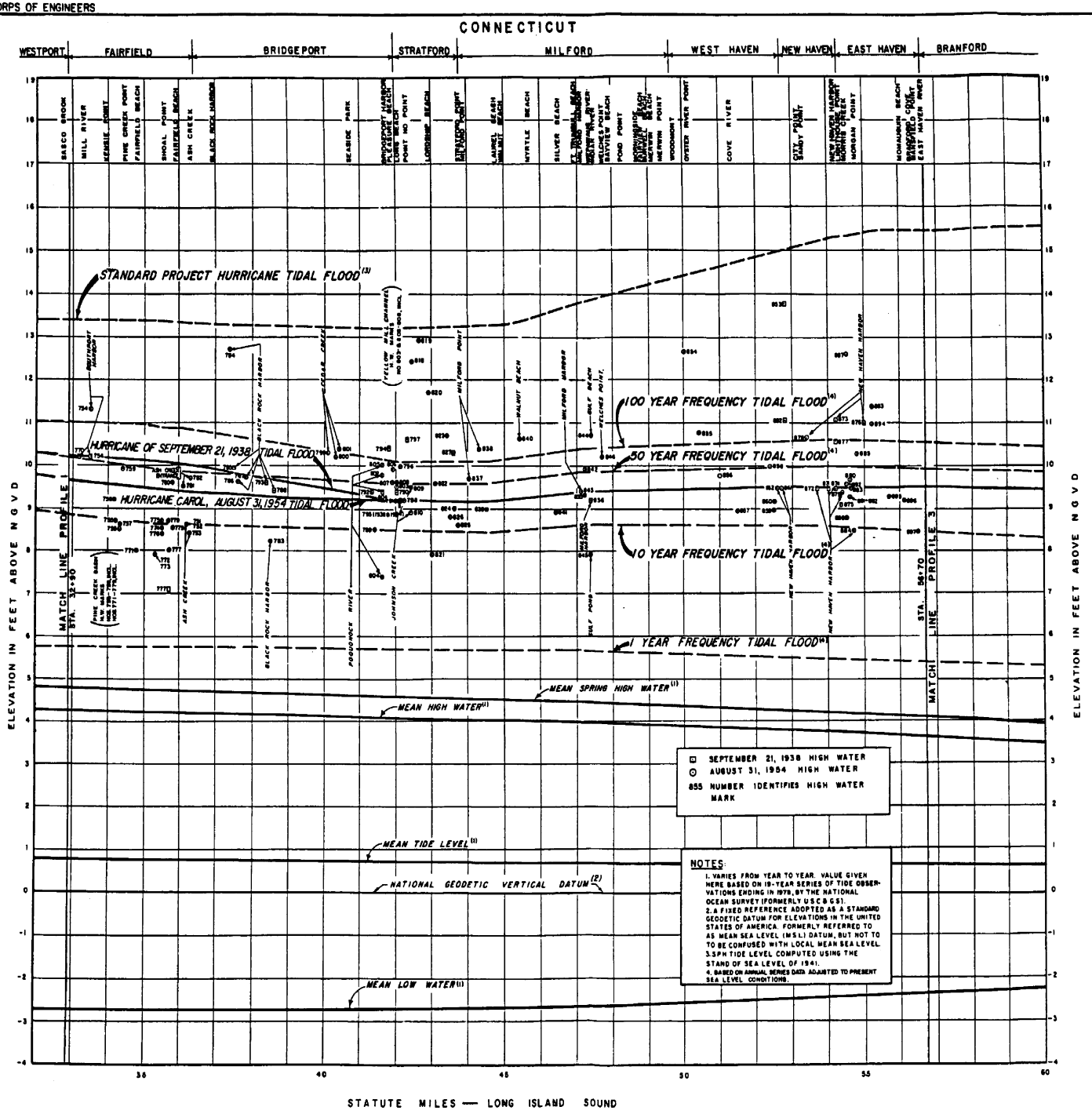
CORPS OF ENGINEERS

U.S. ARMY



NEW ENGLAND COASTLINE
TIDAL FLOOD SURVEY
BASE MAP FOR PROFILE NO. 2
FAIRFIELD, CONN. TO
EAST HAVEN, CONN.
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.
SEPTEMBER 1966

FIGURE 3

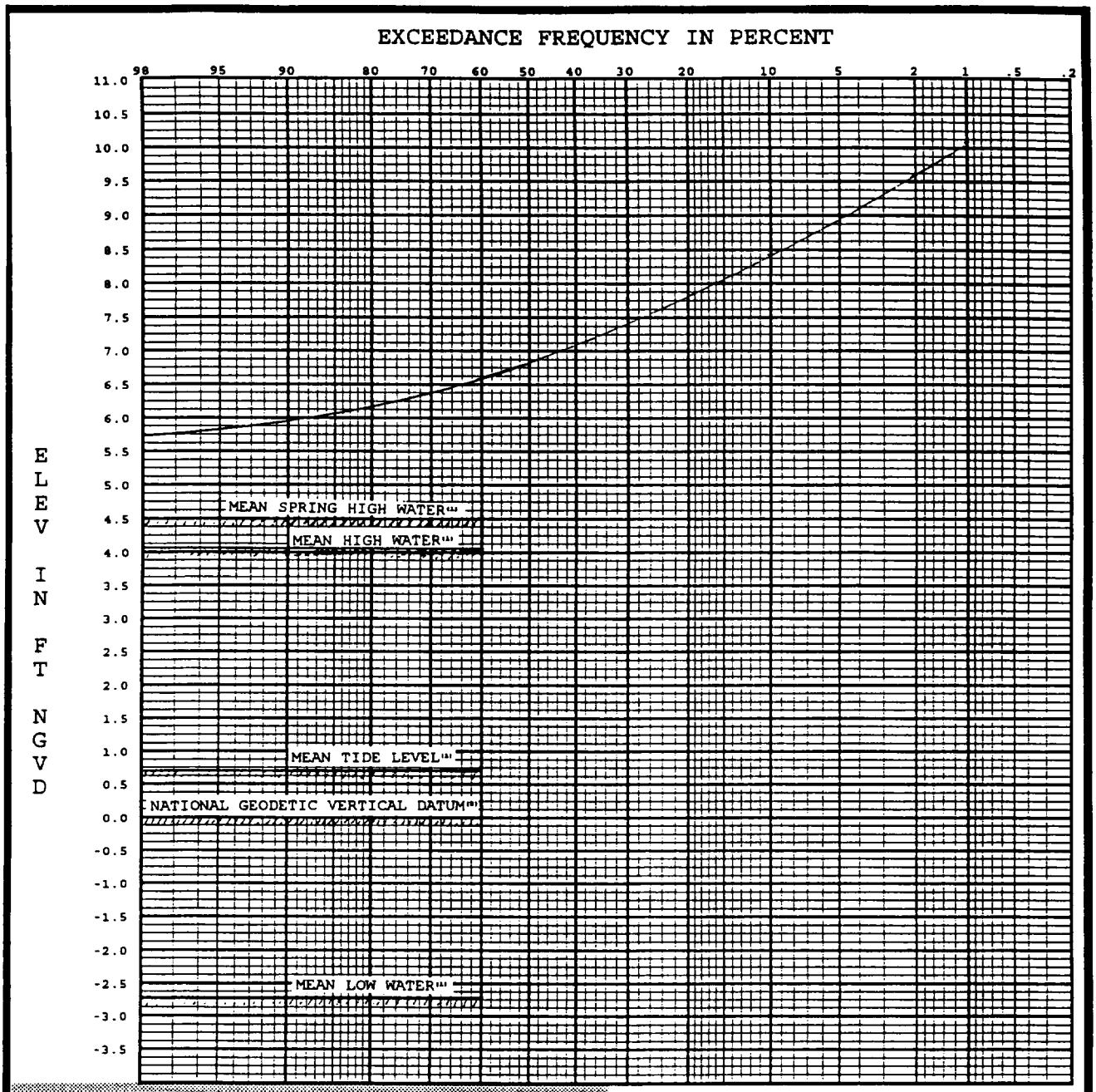


NEW ENGLAND COASTLINE
TIDAL FLOOD SURVEY

TIDAL FLOOD PROFILE NO. 2
FAIRFIELD, CONN., TO
EAST HAVEN, CONN.

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.
SEPTEMBER 1980

FIGURE 4



NOTES:

1. Varies from year to year. Value given here based on 19-year series of tide observations ending in 1978, by the National Ocean Survey (formerly USC&GS).
2. A fixed reference adopted as a standard geodetic datum for elevations in the United States of America. Formerly Referred to as Mean Seal Level (MSL) Datum, but not to be confused with local Mean Sea Level.
3. Plotted frequency curve based on annual series data adjusted to present sea level conditions.

NEW ENGLAND COASTLINE
TIDAL FLOOD SURVEY

TIDAL FREQUENCY CURVE

September 1988

FIGURE 5